

throughout the world—violence that could suddenly escalate to a nuclear confrontation, as it has all too often threatened to do in the past.

Kull brilliantly dissects what we call the “weaponitis” of nuclear policymakers. But he fails to extend his critique to the weaponitis exhibited by many of the policymakers’ critics. Still, *Minds At War* is one of the most original and important works in the vast nuclear literature. All serious students of Armageddon should read it.

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A Tour of Computers

Ideas and Information. Managing in a High-Tech World. ARNO PENZIAS. Norton, New York, 1989. 224 pp. \$17.95.

Arno Penzias, vice-president for research at AT&T Bell Labs, Nobel prizewinner for measuring the temperature of the universe, and serious amateur sculptor, has written a book full of “ideas and information,” but don’t let the subtitle fool you. This is not a book about technology management. “Coping in a High-Tech World” might have served a little bit better. It’s a book about how it all works, written for people who don’t already know.

In essence, Penzias takes us on a leisurely tour of the world of computers. He takes plenty of time along the way to tell us why Napoleon lost at Trafalgar, why there are 60 seconds in a minute and 60 minutes in an hour, and how to analyze a balky automobile engine. He points out that, just as the telegraph ended the brief if glorious day of the pony express, the fax is likely to do the same for the Federal Express. He even tells us about his disappointment upon learning that a part he was ordering from a catalogue couldn’t be shipped until the next week, in spite of a promise in the catalogue of same-day service. “You must have a very old catalogue,” he was told, without a trace of irony, “Now we have a computer.”

Nevertheless, this is a book about computers. We learn how a transistor works, how an integrated circuit chip is fabricated, how formal logic works, and how simple circuits can perform logic operations, and so on, through binary numbers, registers, compilers, and all the rest. The tour is anything but pedantic and orderly. We start with the catalogue clerk and get to the transistor somewhere in the middle of the book. But it is comprehensive. Penzias’s goal seems to be

to tell his reader, not in detail but in broad general principles, what computers are about and what they’re likely to be good for.

Penzias has the born teacher’s knack of simplicity. It serves him well in describing the transistor as a cheese sandwich, but the reader starts to get vaguely uneasy when he applies the same principle to historical events. For example, he tells us that the telegraph was invented by Samuel F. B. Morse, with help from William Sturgeon and Joseph Henry, who had discovered how to make an electromagnet. I think the story is considerably more complicated, involving Oersted and Ampère, Gauss and Weber, and Cooke and Wheatstone among many others. But then again, the transistor is also more complicated than a cheese sandwich. If simplifying technology is a virtue, why should simplifying history be a vice?

This is not a book for experts or high-brow critics. It is the view of an intelligent, knowledgeable, and fluent observer, watching and describing a historic revolution, from a privileged vantage point, written in a way that nearly anyone can understand.

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Some Other Books of Interest

Science Off the Pedestal. Social Perspectives on Science and Technology. DARYL E. CHUBIN and ELLEN W. CHU. Wadsworth, Belmont, CA 1989. xii, 196 pp. Paper, \$17.75.

Courses in what the editors describe as “the multidiscipline of science, technology, and society,” or STS, are now taught on a number of campuses, and this collection of readings is intended to aid both students and instructors in such courses in the effort “to take science off the pedestal on which modern culture has deposited it, to dig into problematic issues, and to be skeptical of pat solutions of untested assumptions.” The emphasis of the collection is, as the subtitle suggests, on the impact of science on society rather than on its internal workings. Examples used are mostly relatively recent, rather than historical, episodes, and many contributions expound conclusions drawn as much from the authors’ own work as from comprehensive literature surveys. In part 1, Science, Technology, and Other Social Institutions, James C. Petersen and Gerald Markle discuss controversies involving science and technology (biomedical issues in particular), Ron Westrum discusses the handling of anomalous or implausible phenomena (“hidden events”), and Rae Goodell and

Sheila Jasanoff respectively discuss the relations of science with the press and with the legal system. Part 2 of the book, entitled World Views and the Politics of Knowledge, opens with an overview of the discipline of sociology of science by Sal Restivo. Further papers consider the use of citation analysis (Susan E. Cozzens), scientific communication as related to national security (Thomas F. Gieryn), research malpractice (Chubin), and the implications of biotechnology (Markle and Stanley S. Robin). In part 3, Science and Technology as Public Resources, Edwin Mansfield presents an economist’s view of research and development, Arie Rip discusses the issue of technological determinism, Edward J. Woodhouse considers problems of political judgment in the face of scientific uncertainty, Michael S. Brown discusses issues pertaining to occupational health and safety, and Stephen P. Turner explores the differences between scientific knowledge and the kind of knowledge involved in making policy decisions. Each paper and group of papers in the volume is preceded by an introduction by the editors, who also add a brief “postscript,” an appendix listing “STS resources,” and a glossary defining a sampling of terms used in the book.—K.L.

Einstein Simplified. Cartoons on Science. SIDNEY HARRIS. Rutgers University Press, New Brunswick, NJ, 1989. Unpag. Paper, \$9.95.

The word “simplified” seems to have passed out of favor for titles of works of popular science, and its parody in the cartoon appearing on the cover of this collection ought to put a definitive end to its use. The cartoon consists of three portraits of the famous scientist progressing from a full panoply of hair, mustache, and wrinkles to a few barely recognizable strokes of the pen. Inside the book are some 170 more of Harris’s cartoons, reprinted from periodicals scientific and otherwise. Some of the cartoons utilize well-worked themes (the equation-laden blackboard, evolutionary progression, Newton with apples), and a few (Boole ordering lunch) are on the arcane side. Though some on modern historical themes don’t go beyond what contemporary cartoonists were able to do with the themes (Röntgen shining a light through his wife), others add a new twist (M. Pasteur being introduced to a colleague in milk improvement, M. Homogen). Among those dealing with present-day themes, genetic engineering and elementary particles are frequent targets, as are such extra-laboratory phenomena as food additives and computers. Some of the pithiest of the cartoons, to this browser, are those dealing with less-than-

big science—the fish worrying about the effect on the food chain of a strike by the plankton, the hunter-gathers who now “usually eat out.” The book closes with a drawing of the universe prior to the Big Bang.—K.L.

Newton's Dream. MARCIA SWEET STAYER, Ed. Published for *Queen's Quarterly* by McGill-Queen's University Press, Montreal, 1988. vi, 135 pp., illus. \$19.95. Based on lectures, Kingston, Ontario, 1987.

This book stems from a commemoration of another book—Newton's *Principia*. In 1987, as part of the Canadian celebration of the *Principia's* tercentenary, a series of public lectures were delivered in Kingston, Ontario, by “distinguished visiting scholars in science, the social sciences, and the humanities” who “examined the impact of Newton's thought from a variety of perspectives.” The reception accorded the lectures led to this effort to make them available to a wider audience. In all there are eight lectures. The first four deal directly with Newton's work and its influence. Richard Westfall discusses the *Principia* as related to the Scientific Revolution generally, attempting to correct popular misconceptions thereof, and W. H. Newton-Smith expounds the development of the concept of scientific rationality stemming from Newton's work, questioning the validity of the concept as delimiting “some special and privileged form of rationality.” D. D. Raphael examines the influence of Newton, complemented by that of Hume, on Adam Smith, and in a more biographical essay A. P. French traces the development of Newton's own thought. The remaining lectures take up more recent concerns. Werner Israel traces the evolution of the concept of black hole, which “may well be as old as the theory of gravitation” though the name dates back only to 1967. Stephen Smale, in considering “the Newtonian contribution to our understanding of the computer,” is critical of the “idea of the computer as a finite instrument” as embodied in the Turing machine and suggests “a different model for computer theory based on the idea of using real numbers.” Steven Weinberg discusses “Newton's dream”—to understand all of nature . . . through principles of physics that could be expressed mathematically—as a motivation of 19th-century chemistry and 20th-century physics. Denys Wilkinson concludes the volume with a consideration of symmetry, proceeding from a discussion of such examples of broken symmetry as Chartres Cathedral and the famous bust of Queen Nefertiti to a consideration of issues of symmetry in elementary particle physics.—K.L.

Books Received

Advances in Turbulence. William K. George and Roger Arndt, Eds. Hemisphere, New York, 1989. xii, 234 pp., illus. \$60. From a symposium, Minneapolis, MN, June 1986.

AIDS. Pathogenesis and Treatment. Jay A. Levy, Ed. Dekker, New York, 1989. xxiv, 632 pp., illus. \$99.75. Immunology Series, vol. 44.

America's Neighborhood Bats. Merlin D. Tuttle. University of Texas Press, Austin, 1988. viii, 96 pp., illus. \$19.95; paper, \$9.95. A guide to “understanding and learning to live in harmony with them.”

Atlas of Entomopathogenic Fungi. Robert A. Samson, Harry C. Evans, and Jean-Paul Latgé. Springer-Verlag, New York, and Bunge, Utrecht, 1988. xii, 187 pp. \$89.50.

Attitudes and Behavioral Decisions. Arnold Upmeyer, Ed. Springer-Verlag, New York, 1988. xii, 268 pp., illus. \$49. Springer Series in Social Psychology.

Basic Concepts of Chemistry. Leo J. Malone. 3rd ed. Wiley, New York, 1989. xxii, 682 pp., illus. \$42.50.

Basic Statistics. Tales of Distributions. Chris Spatz and James O. Johnston. 4th ed. Brooks/Cole, Pacific Grove, CA, 1988. xvi, 395 pp., illus. \$35.25.

Carbohydrate Chemistry. John F. Kennedy, Ed. Clarendon (Oxford University Press), New York, 1988. xii, 678 pp., illus. \$150.

Cell Interactions in Visual Development. S. Robert Hilfer and Joel B. Sheffield, Eds. Springer-Verlag, New York, 1988. xii, 175 pp., illus. \$75. Cell and Developmental Biology of the Eye. From a symposium, Philadelphia, PA, Oct. 1987.

Characterizations and Analysis of Block Designs. A. K. Nigam, P. D. Puri, and V. K. Gupta. Wiley, New York, 1988. viii, 176 pp. \$24.95.

Chemical Structure Software for Personal Computers. Daniel E. Meyer, Wendy A. Warr, and Richard A. Love, Eds. American Chemical Society, Washington, DC, 1988. xiv, 107 pp., illus. \$49.95; paper, \$39.95. ACS Professional Reference Book.

Chemistry of High-Temperature Superconductors II. David L. Nelson and Thomas F. George, Eds. American Chemical Society, Washington, DC, 1988. xii, 338 pp., illus. \$64.95. ACS Symposium Series, vol. 377. From a symposium, Los Angeles, CA, Sept. 1988.

Crystallization and Polymorphism of Fats and Fatty Acids. Nissim Garti and Kiyotaka Sato, Eds. Dekker, New York, 1988. x, 450 pp., illus. \$180. Surfactant Science Series, vol. 31.

Current Issues in Neural Regeneration Research. Paul J. Reier, Richard P. Bunge, and Fredrick J. Seil, Eds. Liss, New York, 1988. xx, 410 pp., illus. \$76. Neurology and Neurobiology, vol. 48. From a symposium, Pacific Grove, CA, Dec. 1987.

Down by the River. The Impact of Federal Water Projects and Policies on Biological Diversity. Constance Elizabeth Hunt with Verne Huser. Island Press, Washington, DC, 1988. xx, 266 pp., illus. \$34.95; paper, \$22.95.

The Early Universe. Facts and Fiction. G. Börner. Springer-Verlag, New York, 1988. xiv, 439 pp., illus., + plates. \$69. Texts and Monographs in Physics.

Ecology and Human Organization on the Great Plains. Douglas B. Bamforth. Plenum, New York, 1988. xiv, 217 pp., illus. \$29.50. Interdisciplinary Contributions to Archaeology.

Effective Writing Strategies for Engineers and Scientists. Donald C. Woolston, Patricia A. Robinson, and Gisela Kutzbach. Lewis, Chelsea, MI, 1988. xvi, 181 pp., illus. \$24.95.

Elastic and Diffractive Scattering 2. K. Goulianos, Ed. Editions Frontières, Gif sur Yvette, 1988. xxii, 386 pp., illus. \$45. From a conference, NY, Oct. 1987.

Erich F. Schmidt's Investigations of Salado Sites in Central Arizona. The Mrs. W. B. Thompson Archaeological Expedition of the American Museum of Natural History. John W. Hohmann and Linda B. Kelley. Museum of Northern Arizona Press, Flagstaff, 1988. xviii, 251 pp., illus. Paper, \$14.95. Museum of Northern Arizona Bulletin no. 56.

The Evolution of Sex. Robert Bellig and George Stevens, Eds. Harper and Row, San Francisco, 1988. x, 202 pp., illus. \$19.95. From a conference, St. Peter, MN, 1987. Lectures by John Maynard Smith, Lynn Margulis and Dorion Sagan, Peter H. Raven, William Donald Hamilton, Sarah Blaffer Hrdy, and Philip J. Hefner.

Explanation and Experiment in Social Psychological Science. Realism and the Social Constitution of Action. John D. Greenwood. Springer-Verlag, New York, 1989. xvi, 264 pp. \$35.

Fish and Their Behavior. Gunther K. H. Zupanc.

Tetra, Melle, F.R.G., 1988 (U.S. distributor, Tetra Sales, Morris Plains, NJ). iv, 187 pp., illus. \$12.95.

Flora of New Zealand. Freshwater Algae, Chlorophyta, Desmids. Vol. 2. Hannah Croasdale and Elizabeth A. Flint. Botany Division, Department of Scientific and Industrial Research, Christchurch, 1988. x, 147 pp. + plates. NZ\$57.50.

Flow and Transport in the Natural Environment. Advances and Applications. W. L. Steffen and O. T. Denmead, Eds. Springer-Verlag, New York, 1988. viii, 384 pp., illus. \$69. From a symposium, Canberra, Australia, Sept. 1987.

Foragers and Farmers. Population Interaction and Agricultural Expansion in Prehistoric Europe. Susan Alling Gregg. University of Chicago Press, Chicago, 1989. xx, 275 pp., illus. \$24.95; paper, \$9.95. Prehistoric Archeology and Ecology.

Free Energy Transduction and Biochemical Cycle Kinetics. Terrell L. Hill. Springer-Verlag, New York, 1989. x, 119 pp., illus. Paper, \$27.

Functionalism Historicized. Essays on British Social Anthropology. George W. Stocking, Jr., Ed. University of Wisconsin Press, Madison, 1988. vi, 244 pp., illus. \$25; paper, \$12.95. History of Anthropology, vol. 2. Reprint, 1984 ed.

Fundamental Metallurgy of Gas-Shielded Arc Welding. N. M. Novozhilov. Gordon and Breach, New York, 1988. x, 400 pp., illus. \$129. Translated from the Russian edition (Moscow, 1979) by N. Standen.

Fundamental Processes of Atomic Dynamics. J. S. Briggs, H. Kleinpoppen, and H. O. Lutz, Eds. Plenum, New York, 1988. xii, 693 pp., illus. \$120. NATO Advanced Science Institutes Series C, vol. 181. From an institute, Maratea, Italy, Sept.-Oct. 1987.

The Heterosexual Transmission of AIDS in Africa. Dieter Koch-Weser and Hannelore Vanderschmidt, Eds. Abt, Cambridge, MA, 1988. xvi, 293 pp., illus. \$39.95; paper, \$29.

Heterosiloxanes. Vol. 1. Derivatives of Non-Biogenic Elements. M. G. Voronkov, E. A. Maletina, and V. K. Roman. Harwood, New York, 1988. xiv, 469 pp., illus. \$298. Soviet Scientific Reviews Supplement Series. Translated from the Russian edition (Novosibirsk, 1985) by Kurt Gingold.

Human Abilities in Cultural Context. S. H. Irvine and J. W. Berry, Eds. Cambridge University Press, New York, 1988. xxii, 610 pp., illus. \$69.50.

Human Biology. Form, Function, and Adaptation. William DeWitt. Scott, Foresman, Glenview, IL, 1988. xvi, 605 pp., illus. \$25.

Hydrodynamics and Sediment Dynamics of Tidal Inlets. David G. Aubrey and Lee Weishar, Eds. Springer-Verlag, NY, 1988. x, 456 pp., illus. Paper, \$50.30. Lecture Notes on Coastal and Estuarine Studies, vol. 29. Based on a symposium, Woods Hole, MA, Dec. 1986.

Interleukin 2. Kendall A. Smith, Ed. Academic Press, San Diego, CA, 1988. xxii, 311 pp., illus. \$69.

International Navigation. Rocks and Shoals Ahead? Jon M. Van Dyke, Lewis M. Alexander, and Joseph R. Morgan, Eds. Law of the Sea Institute, University of Hawaii, Honolulu, 1988. x, 435 pp., illus. \$39. From a workshop, Honolulu, HI, Jan. 1986.

Intuitive Judgments of Change. Linda Silka. Springer-Verlag, New York, 1988. x, 214 pp. \$49. Springer Series in Social Psychology.

The Inverse Gaussian Distribution. Theory, Methodology, and Applications. Raj S. Chikara and J. Leroy Folks. Dekker, New York, 1989. x, 213 pp., illus. \$79.95. Statistics, vol. 95.

Islands in a Far Sea. Nature and Man in Hawaii. John L. Cullinney. Sierra Club Books, San Francisco, 1988. xiv, 410 pp., illus. \$24.95.

James J. Gibson and the Psychology of Perception. Edward S. Reed. Yale University Press, New Haven, CT, 1989. xii, 348 pp., illus. \$32.50.

Judicial Decision Making, Sentencing Policy, and Numerical Guidance. Austin Lovegrove. Springer-Verlag, New York, 1988. xii, 320 pp., illus. \$76. Research in Criminology.

Der Kreis um Konrad Lorenz. Ideen, Hypothesen, Ansichten. W. M. Schleidt, Ed. Parey, Berlin, 1988. 206 pp. DM 38. Biologie und Evolution Interdisziplinär. Forty-seven papers, in German, honoring the ethologist on his 85th birthday.

Laboratory Diagnosis of Infectious Diseases. Vol. 2. Viral, Rickettsial, and Chlamydial Diseases. E. H. Lennette, P. Halonen, and F. A. Murphy, Eds. Springer-Verlag, New York, 1988. xxvi, 961 pp., illus. \$140.

Learning and Individual Differences. Advances in Theory and Research. Phillip L. Ackerman, Robert J. Sternberg, and Robert Glaser, Eds. Freeman, New York, 1989. xiv 343 pp., illus. \$29.95; paper, \$19.95. A series of Books in Psychology.